Attorney Docket No.: AT-000224 US

WHAT IS CLAIMED IS:

- 1 1. A computer method comprising:
- 2 providing a database comprising a compendium of at least one of patient
- 3 treatment history; orthodontic therapies, orthodontic information and diagnostics;
- 4 employing a data mining technique for interrogating said database for generating
- 5 an output data stream, the output data stream correlating a patient malocclusion with an
- 6 orthodontic treatment; and
- applying the output data stream to improve a dental appliance or a dental
- 8 appliance usage.
- 1 2. The method of claim 1, further comprising generating a plurality of appliances
- 2 having geometries selected to progressively reposition the teeth, wherein the appliances
- 3 comprise polymeric shells having cavities and wherein the cavities of successive shells
- 4 have different geometries shaped to receive and resiliently reposition teeth from one
- 5 arrangement to a successive arrangement.
- 1 3. The method of claim 2, wherein the sequence of appliances includes a sequence
- of configurations of braces, the braces including brackets and archwires.
- 1 4. The method of claim 2, wherein the sequence of appliances includes a sequence
- 2 of polymeric shells manufactured by fitting polymeric sheets over positive models
- 3 corresponding to the teeth of the patient.
- The method of claim 1, wherein the sequence of appliances includes a sequence
- 2 of polymeric shells manufactured by stereo lithography from digital models
- 1 6. The method of claim 1, wherein the output data stream is related to clinical
- 2 constraints.

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- 7. The method of claim 6, wherein the clinical constraints include a maximum rate
- of displacement of a tooth, a maximum force on a tooth, and a desired end position of a
- 3 tooth.
- 1 8. The method of claim 7, wherein the maximum force is a linear force or a torsional
- 2 force.
- 1 9. The method of claim 7, wherein the maximum rate of displacement is a linear or a
- 2 angular rate of displacement.
- 1 10. The method of claim 6, wherein the clinical constraints include a maximum rate
- 2 of displacement of a tooth.
- 1 11. The method of claim 6, wherein the clinical constraints include a maximum rate
- 2 of linear displacement of a tooth.
- 1 12. The method of claim 6, wherein the clinical constraints include a maximum rate
- 2 of rotational displacement of a tooth.
- 1 13. The method of claim 1, wherein the last of the sequence of appliances is a
- 2 positioner for finishing and maintaining teeth positions.
- 1 14. The method of claim 1, further comprising:
- 2 comparing an actual effect of the appliances with an intended effect of the appliances;
- 3 and
- 4 identifying an appliance as an unsatisfactory appliance if the actual effect of the
- 5 appliance is more than a threshold different from the intended effect of the appliance and
- 6 modifying a model of the unsatisfactory appliance according to the results of the
- 7 comparison.

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- 1 15. The method of claim 1, further comprising capturing at least an initial tooth
- 2 position, a target tooth position; and one or more intermediate tooth positions.
- 1 16. The method of claim 1, further comprising analyzing one of the intermediate
- 2 tooth positions with the target position.
- 1 17. The method of claim 1, further comprising capturing characteristics tags
- 2 associated with a patient case to label captured data.
- 1 18. The method of claim 17, further comprising aggregating data of a set of
- 2 treatments based on their tags and rating the set of treatments based on the aggregated
- 3 data.
- 1 19. The method of claim 18, further comprising comparing performance of a plurality
- 2 of sets of treatments.
- 1 20. The method of claim1, further comprising applying models to calculate risk of
- 2 treatment complications for individual patients.
- 1 21. The method of claim 20, further comprising identifying a treatment case for
- 2 special handling.
- 1 22. The method of claim 20, further comprising identifying a treatment case for
- 2 special treatment parameters including clinical constraint.

- 1 23. The method of claim 20, further comprising clusterizing clinical practitioners by
- 2 practice habits.
- 1 24. The method of claim 23, wherein treatment parameters are adapted to preferences
- 2 specific to each cluster.
- 1 25 The method of claim 1, further comprising applying probabilistic models to
- 2 predict discrepancies between targeted and actual tooth position at given stages in
- 3 treatment, and where said predictions are calculated into treatment plans.